

Securing the Past for the Future

The Project

In 2015, Carnegie Museum of Natural History (CM) was awarded a three-year grant to improve the storage, sustainability, organization, and environmental conditions in its Section of Anthropology with particular, but not exclusive, emphasis on its archaeology collection, which had been stored on open and severely overcrowded shelving since 1979.

The project's major accomplishment was the transfer of the 1.5 million artifacts in the museum's archaeology collection from open shelving to state-of-the-art cabinetry and compactors. This task, however, first required that the collection be put into temporary storage to remove existing shelving and prepare the space for compactor installation. With the assistance of interns, volunteers, and twelve University of Pittsburgh students, the CM project team moved all 1.5 million artifacts out of the collection space. Items removed from shelving included archaeological collections in boxes, ceramic and large stone artifacts stored on open shelves, spears stored on horizontal racks, and oversized objects such as kayaks, large baskets and other ethnological objects stored on the tops of some shelves. Movement of ultra-heavy stone objects and two unwieldy boats required assistance from the museum's Facilities, Planning and Operations department. In addition to clearing space for compactor installation, this move served to permanently relocate all the ethnological material to the ethnology collection on the second floor. Carefully-tested archival materials and innovative storage techniques were developed throughout the project to cradle and pad the artifacts, making this collection as well cared for as any in the country.



After the new shelving and compactors were installed, CM began the tedious task of rehousing objects on/in the new shelving systems. When this project began, it was difficult to predict the immense level of hands-on detail that was required to remove individual artifacts and objects from their original storage locations and then stabilize and rehouse those individual pieces in new locations. For example, as objects and artifacts were placed in the new storage cabinets, more than 6,000 were individually fitted with custom-made storage mounts using stable, archival materials thoughtfully chosen for that purpose. The condition of about 7,000

plastic boxes containing artifacts were examined and replaced, as necessary, before being transferred to the new cabinets. All bubble pack was removed and replaced by Ethafoam™ in those boxes. Also, cavity and ring storage mounts were custom made for individual, larger pots, which were organized by cultural affinity in the stationary cabinets.

In addition to individual object conservation measures and improved storage methods, the project enhanced collection access throughout the space by making much-needed organizational improvements designed to ensure the collection's long-term future. Cantilever shelving was installed and used to store canoes and kayaks previously placed on top of the old open archaeology shelves. Three offices were demolished to make room for all the collection's archives that had been scattered in locations on both the first and second floors. An area was set aside for the orderly storage of all

collection supplies, significantly reducing clutter throughout storage spaces. A single storage area for large, heavy objects was created at one end of the new compactor units. A unique storage system for the small collection of saddles, which maximized the use of valuable floor space, was completed. Racks for the storage of textiles were constructed and more efficient, safe, and accessible storage for the spear and arrow collection was devised.

Although the original project did not include any data digitization efforts, as work progressed, it became clear that recording temporary, and eventually permanent, storage locations was important. For that purpose, a large database was created. Additionally, the recruitment of volunteers and interns for aspects of this project introduced the project team to people with database skills. This subsequently led to data capture of 11,682 archaeological site records, which previously only existed as handwritten records.

Novel Storage Methods

In addition to reorganizing and stabilizing the collection of 1.5 million archaeological objects and artifacts, during the grant period, the project team considered a variety of new materials and techniques for stabilizing individual pieces. This work resulted in CM creating and employing some novel storage methods well suited for a collection of unique objects. Initial experimentation for these storage methods was developed by the museum's conservator during her tenure at the Science Museum of Minnesota. During her time at CM, these methods were refined and put into practice.

High Density Storage: Storage space for collections is always at a premium in museum collections. Through this project, CM developed creative methods to maximize space while reducing risk to objects. One of the challenges presented by this collection was managing the organization of highly repetitive and/or small objects, while allowing for easy access. This situation demanded creativity and organization. In one case, thousands of very small Costa Rican ceramic pots were placed into trays that could then be stacked in drawers. The footprint of the tray was designed to maximize the floor of each drawer so that four trays could easily fit into a single drawer. Each tray was divided into a grid using acid free cardboard and ceramics were placed in the padded cavities. For slightly larger pieces, a standard foam cavity lined with Tyvek™ was made. These trays are designed to be safely stacked by using corner supports attached to the bottom tray. To maintain inventory control, each cavity is identified with the catalog number of the pot, a full inventory is placed on the tray, and its horizontal and vertical locations are entered into the computer data base. There are over 5,000 miniature ceramics stored in two of the new cabinets. Prior to the storage upgrade, each of these ceramics was wrapped individually with degrading bubble wrap in plastic boxes.

CM also used high density storage methods to protect and store its spears and arrows, which are too large to fit into cabinets. Previously, these objects were stored on a horizontal rack system developed by the museum's first conservator. This system was located on top of old archaeology shelving that was removed for this project. In order to house the approximately 200 spears, shelves were removed from five



old metal shelving units, leaving only the top and bottom shelves. The sides and backs of the units were padded, and the spears and arrows were tied vertically to the sides and backs. Tyvek dust covers were made to protect the objects. This storage method shifts the objects' orientation from horizontal to vertical, reducing the potential for the shafts to sag or warp. This method also makes the spears and arrows more accessible.



Micro-climate Storage: Like many museums, CM has collections that will deteriorate under unstable environmental conditions. Archaeological and ethnographic metals are most susceptible to this deterioration. Creating a storage environment that minimizes high relative humidity and chemical presence is one way to ameliorate these conditions. As part of this project, CM created micro-climates for small metal objects using readily available (and inexpensive) materials. The plastic boxes (polypropylene) were tested to make sure they are made of stable plastics. All holes were sealed with inert gasket materials such as scraps of closed cell foam. In the case pictured, stackable trays made of acid-free board and covered closed cell foam with custom cavities were constructed, and space was left for a container of desiccant. The items in the box were then photographed and inventoried. This information was placed on the lid and in the collection's database in an effort to limit the number of times that the box is opened and its

contents exposed to the atmosphere. Each finished container also includes a humidistat card to monitor the relative humidity.

This system of using different materials depending on the conditions to be mitigated, can be applied to all collections. CM has used this method in its vertebrate paleontology and minerals and gems collections to reduce damage to fossil materials sensitive to high relative humidity, such as pyrite disease. Alternatively, users could enclose activated charcoal or zeolites to absorb organic pollutants. The creative use of ideas, testing, materials, and experimentation are vital in the development of these methods.

Dust Covers for Large Objects: Often, objects in museum collections simply do not fit in cabinets. There are often objects that are on open shelving, or stored above the cabinets or shelves. The common method to “protect” these objects is to throw a cotton or plastic sheet over them, leaving the sheet directly in contact with the object. Pittsburgh, Pennsylvania (where CM is located) has a long history of severe air pollution, both gaseous and particulate. The oldest of CM's collections have been exposed to this serious risk for a century. In addition, CM's collections are in aging (albeit historic) structures, and there is a history of water incursion. Consequently, most collections that are stored in the open have been covered by plastic sheeting that was over 20 years old and degrading.

Through this project, CM employed an alternate storage system for these large objects. Based originally on an article by CM's first conservator in which objects were placed on bases and a wooden



frame created to drape the plastic, this method was upgraded by using PVC plumbing pipe to create a support for the dust/water cover. PVC piping is easy to come by, easy to use for construction. The pipe is cut to size and fitted into various connectors and cemented in place, or left loose so it can be easily disassembled. Then, a Tyvek™ cover is made. This protects the object from light, dust, and water. Drapery weights are then stitched into the bottom to help control the drapes. Cotton twill tape is stitched on to keep the sides closed. A photograph of the object(s) behind the drape is posted outside of the covering for easy identification. The examples shown are delicately carved extinct bird sculptures. They previously were protected by huge black garbage bags laying directly on the sculptures. The

new method is cleaner, neater, and removes the potential of damaging the delicate carved and painted surface.

Saddle Storage: A unique, new storage method was devised to properly house CM's saddle collection. Previously, saddles were stored on padded sawhorses, which took up a significant amount of valuable floor space and left them vulnerable to tipping over. Additionally, they were covered with plastic sheeting that slowly degraded. CM's conservator began by building a saddle support system using an existing support column in the ethnology collection. Shelving uprights were purchased and installed. CM's conservator removed plastic covering and oversaw the time-consuming cleaning of each saddle to remove decades of



sooty pollution from the leather. The conservator constructed a shelf and support customized for each saddle. The platforms were constructed from plywood, wrapped in Marvelseal™ with Ethafoam™ support and lined with acrylic felt and Tyvek™ or muslin. Each platform was attached to shelf supports. Three saddles fit on one side of the column, and three additional saddles were positioned on the same column at a 90° angle to the first three. A dust cover was then constructed from Tyvek™ to protect all the saddles.

The new housing followed (and even established) new, best practices for storage and stabilization. Careful documentation, and excellent organization of the collection provides for the long-term preservation of the artifacts and objects in the museum's care. The work that has been accomplished fulfills CM's mission to handle the collections in a way that ensures they will be available for study and exhibition in the decades ahead.

Peer education

CM has gone to great lengths to share its successful storage techniques with the conservation community. In all three years of the project, CM was invited to post its work on STASH (Storage, Technology, for Art, Science and History collections), a web resource hosted by the American Institute for Conservation, which serves as a peer-review for such presentations (<http://stashc.com/>). Innovative ideas from the project were showcased during annual meetings of both the Society for the Preservation of Natural History Collections (SPNHC) and the American Institute for Conservation (AIC). Aspects of the project were first presented at the 2015 AIC Annual Meeting. In the following year (2016), CM presented a poster at the Annual Meeting of the Society for the Preservation of Natural History Collections in Berlin, Germany. This poster was presented again at the ICOM-Nathist (International Council of Museums Committee for Museums and Collections of Natural History) meeting in 2017. CM also presented a talk describing “Creating Dust Covers” at the 2016 AIC Annual Meeting (this became a resource on STASH). For the 2017 AIC meetings in Chicago, CM created a description of the saddle storage methodology.

Resources

The following resources contain more in-depth information about aspects of the project and some of the novel storage methods employed during the project.

- “Micro-climate and High Density Storage: Boxes for Archaeological Metals and Other Environmentally Sensitive Objects” Presentation - STASH 2015 (<http://stashc.com/the-publication/containers-2/boxes/micro-climate-and-high-density-storage-boxes-for-archaeological-metals-and-other-environmentally-sensitive-objects/>)
- “Creating Dust Covers For Large Objects” Presentation - STASH 2016 (<http://stashc.com/the-publication/covers/object-covers/creating-dust-covers-for-large-objects/>)
- Project blog: <https://carnegiemnh.org/researcher/staff-directory/deborah-harding/>